

Balancing Act

Reporting Category Probability and Statistics
Topic Mean as the balance point

Materials

- Large number line (see below)
- Sticky notes
- Ruler

Vocabulary

measure of center, mean, median, mode, fair share (earlier grades)
balance point (6.15)

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Prior to the lesson, create a large number line on which students may affix markers. The number line should start at 0 and extend through at least 20.

1. Begin the lesson by reviewing the importance of statistics in describing, summarizing, and making inference about data. Continue by defining *measures of center* and asking students for their personal definitions of *mean*, *median*, and *mode*. Work through the processes of determining values for measures of center and range.
2. Ask students about the methods they have used previously to calculate the mean of a data set. This should prompt a discussion of the mean as fair share (SOL 5.16). Also, include the definition of ***mean as the average of all data values***.
3. Distribute sticky notes. Poll the class with a specific question to generate data. Choose a question such as one of the following that will have a variety of responses over a fairly wide range:
 - How many relatives live within 100 miles of you?
 - How many states have you visited?
 - How many family vacations can you remember?
 - How many books have you read this year?
 - How many video games do you have?Have each student record her/her response to the question by placing a sticky note marker at the appropriate number on the number line.
4. After each student has placed a marker on a specific data value, explain that ***mean can also be represented as the balance point of the data***. Discuss the meaning of *balance point*. Illustrate balance point by balancing a ruler on your finger, centering it on your finger until it does not fall off.

5. Using the data markers on the number line, start finding the balance point by moving two of the outermost data values (values farthest to the right and to the left) towards each other one unit. Continue this process until all values have been moved towards a center point and are stacked on top of each other at one number. This number is the balance point or mean of the data set.
6. Finally, give the formal definition of the balance point or **mean: the point on a number line where the data distribution is balanced**. This means that the sum of the distances from the mean of all the data points above the mean is equal to the sum of the distances of all the data points below the mean. This is the concept of mean as the balance point. (SOL 6.15, Curriculum Framework) Connect this definition to the class data set prior to the rearrangement, as well as to the illustration of balancing the ruler.

Assessment

- **Questions**
 - What are some challenges that may be faced when using this method for calculating the mean of a data set?
 - How can we verify the mean of a data set mathematically?
- **Journal/Writing Prompts**
 - Explain how to decide when mean is the best measure of center to describe a data set.
 - Explain how to decide when mode is the best measure of center to describe a data set.
 - Explain how to decide when median is the best measure of center to describe a data set.
 - Explain why a measure of center is important when analyzing data.

Extensions and Connections (for all students)

- Have students also find the median and mode for this data set. Based on the values, have them determine which value depicts the best measure of center for this specific data set and explain why.

Strategies for Differentiation

- Show students the actual calculation associated with deriving the balance point or mean prior to use of the number line.
- Prior to building up the concept of mean as the balance point, show an example, including manipulatives, of mean as fair share.